

CHAPTER 1 INTRODUCTION

1.1 BACKGROUND

NorthWestern Energy is an investor owned utility with headquarters in Sioux Falls, South Dakota, and the service territory of the former Montana Power Company with operating offices in Butte, Montana. The NorthWestern Energy service territory is one of the largest in the country serving over 600,000 customers in Montana, South Dakota and Nebraska.

In late 2004, NorthWestern Energy held a non-binding “Open Season” to solicit interest in transmission from Townsend, Montana to the Borah / Brady Substation area in Southwest Idaho, a distance of over 300 miles. Initially, over 2,000 MW of interest was requested by various generators, utilities, and other participants. The study process began with a feasibility study to determine what options there might be to export bulk power from Montana into southeastern Idaho.

Once completed, NorthWestern moved to the second stage of the process, which included that a financial commitment be made by the participants. This stage of the process narrowed down the participant interest to 850 MW. This stage of the process includes further analysis of alternative projects, including identifying alternative routes, a preferred route, various voltage options, AC vs. DC, and estimated costs for the various options. This report is the subject of these investigations and findings.

The report is divided into two major sections. The first section (Chapters 1 through 6) is the siting study, which identified a study area between the 500kV Colstrip lines in western Montana and the Borah / Brady and Midpoint Substation areas in southern Idaho. This study area included area for all voltage options and other alternatives. Existing data were collected inside the siting study area, constraints and opportunities were identified and mapped, and alternative transmission line corridors and routes were identified. Preferred routes were identified for all options.

1.1.1 Document Organization

The Siting Study and Preliminary Engineering Report is divided into two volumes. Volume 2 contains associated maps. Volume 1 is organized into two major sections, Siting Study and Preliminary Engineering. Volume 2 contains associated exhibits. In Volume 1, the chapters and major sections contain the following information:

- This Executive Study introduces the project, describes the organization of the document, and provides a summary of the study and cost estimates.
- Siting Study
 - Chapter 1 (Introduction) provides background information, siting and preliminary engineering study objectives, and an outline of the document organization.
 - Chapter 2 (Siting Study Methods) describes the methods used to conduct the transmission line corridor and routing study.
 - Chapter 3 (Inventory and Sensitivity Analysis) presents the results of environmental data collection used in developing transmission line corridors and routes.

- Chapter 4 (Alternative Corridor Identification) describes corridors identified in the siting study.
- Chapter 5 (Alternative & Preferred Route and Station Sites Identification) describes transmission line routes and potential substation sites and compares the alternatives.
- Chapter 6 (Authorizations and Permits) summarizes anticipated permitting at the state and federal level.
- Preliminary Engineering
 - Chapter 7 (Transmission Line Design Criteria) describes the assumption used to develop Transmission Line Design Criteria and mechanical and electrical loading.
 - Chapter 8 (Conductor Study) summarizes the conductor study, conductors considered, and conductor thermal capacities.
 - Chapter 9 (Structure Study) evaluates various tower configurations, reliability and maintenance.
 - Chapter 10 (Cost Estimates) compares the various electrical and substation configurations and cost sensitivities the line and station components.
 - Chapter 11 (Future Studies) identifies areas of recommended additional engineering study under design criteria, load flow modeling and lightning.
 - Chapter 12 (Permitting and Right-of-Way Costs) includes the assumptions in permitting the project and right-of-way acquisition and total costs.
 - Chapter 13 (Preliminary Project Schedule) provides an estimate of permitting, right-of-way acquisition, engineering and construction schedule.
- Appendix A contains supplemental environmental impact data on route and subroute alternatives.
- Appendix B identifies stringing, construction and maintenance loads.
- Appendices C through K are drawings, figures and tables associated with preliminary engineering.
- Appendix L provides a list of personnel involved in developing the siting study, ROW and permitting costs, and preliminary engineering costs.

1.2 SITING STUDY OBJECTIVES

The purpose of this siting study, which is part of this stage of the transmission study process, is to determine a reasonable preferred route for preliminary engineering and estimated cost to build the line and make the substation improvements. The study is providing both routes and costs for the various system alternatives:

- 230kV Option from Anaconda (Mill Creek) to Borah
- 345kV Option from Townsend to Borah
- 500kV Option from Townsend to Borah
- 500kV DC Option from Townsend to Midpoint

Townsend to Midpoint 500 kV Transmission Line Final Siting Study and Preliminary Engineering Report

POWER Engineers was retained to conduct studies to define alternative corridors, evaluate and select a preferred corridor and ultimately identify a preferred route so that cost estimates and schedules to construct the line can be developed. In addition, a preferred substation alternative will be identified for both the alternative Townsend and Ringling substation sites. A site will also be identified for a series compensation station mid-way along the preferred route.

The remainder of this report documents the findings of the siting study and the cost estimates. Ten maps are also included by reference into this report, and these document the inventoried land use, biological resources, cultural, visual, and engineering constraints. A composite opportunities and constraints map is also included, as well as the identified corridors and alternative routes map.

1.3 PRELIMINARY ENGINEERING STUDY OBJECTIVES

The four system alternatives (230kV, 345kV, 500kV AC and 500kV DC) were identified by NorthWestern to meet various levels of service level needs, up to 850 MW. The preliminary engineering study was performed to evaluate optimal conductor, structure and substation configurations and to identify future study needs. Analysis was performed for the location and requirements of the line for 500kV AC operation for the transmission line. A preliminary conductor optimization study was also performed. Also, an evaluation of potential 500kV tangent structure types and their costs and construction implications was performed. Cost estimates were developed for the transmission line voltage alternatives and accompanying substations for the purposes of system planning and project funding. The purpose of the engineering study was to develop detailed construction costs based on various service level needs.